

REMARKS

Claims 1-4 and 7-20 are pending in this application, of which claims 13-20 are withdrawn from consideration. Reconsideration of the rejections in view of these amendments and the following remarks is respectfully requested.

Rejections under 35 U.S.C. §112

Claims 1 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

In claims 1 and 9, "the rest portion" has been amended to --a remaining portion of the cylindrical projection--.

Thus, claims have been amended to more particularly point out, and distinctly claim the subject matter to which the Applicants regard as their invention. It is believed that this Amendment is fully responsive to the rejection.

Rejection under 35 U.S.C. §102(b)

Claims 1-4, 7 and 8 stand rejected under 35 U.S.C. §102(b) as being anticipated by Yamada (U.S. Patent No. 5,023,683).

Applicants respectfully traverse this rejection in view of the amendments made herein.

Claims 1 recites "a straight cylindrical-shaped storage electrode having a cylindrical projection, an end of the cylindrical projection being located on an uppermost part of the straight cylindrical-shaped storage electrode," and "the edge of the cylindrical projection being rounded and having a larger thickness than a thickness in a remaining portion of the cylindrical projection." Thus, the claimed semiconductor device has a feature that the straight

cylindrical-shaped storage electrode has a cylindrical projection, and an edge of the cylindrical projection is located on an uppermost part of the storage electrode. Also, the edge of the cylindrical projection is rounded and has a larger thickness than a thickness in a remaining portion of the cylindrical projection. Due to this structure, electric field concentration on the upper cylinder edge of the storage electrode is mitigated to thereby preclude leakage current increase and dielectric breakdown of the capacitor dielectric film.

On the other hand, in Yamada does not have a “straight cylindrical-shaped storage electrode,” in the ordinary meaning of the word. In Yamada, the storage node electrode 10b extends outside of the side wall insulating film 9b, as shown in FIG. 1b. Thus, the storage node electrode 10b is warped but not straight cylindrical-shaped. Also, there is no edge of the cylindrical-shaped body located on an uppermost part of the storage electrode 10b. Instead, the end of the storage node electrode is located on the inter-layer insulation film 7a. Thus, the basic structure of the capacitor of Yamada is different from that of the present invention.

Moreover, the edge of the storage electrode 10b of Yamada is not rounded and thickened. Yamada does not discuss the electric field concentration on the edge of the storage electrode. Thus, Yamada neither teaches nor suggests “a straight cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the straight cylindrical-shaped storage electrode,” and “the edge of the cylindrical projection being rounded and having a larger thickness than a thickness in a remaining portion of the cylindrical projection.”

For at least these reasons, independent claim1 patentably distinguishes over Yamada. Claim 2-4, 7 and 8, depending from claim 1, also patentably distinguish over Yamada for at least the same reasons.

Thus, the 35 U.S.C. §102(b) rejection should be withdrawn.

Rejection under 35 U.S.C. §103(a)

Claims 9-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Nam et al (U.S. Patent No. 6,380,579).

Applicants respectfully traverse this rejection.

Claim 9 recites "a straight cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the straight cylindrical-shaped storage electrode," and "the straight cylindrical-shaped storage electrode being formed of a metal film and having a larger thickness at the edge of the cylindrical projection than a thickness in a remaining portion of the cylindrical projection."

Also, claim 11 recites "a straight cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the straight cylindrical-shaped storage electrode," and "the straight cylindrical-shaped storage electrode being formed of a metal film and the edge of the cylindrical projection being rounded."

As discussed above, Yamada neither teaches nor suggests "a straight cylindrical-shaped storage electrode having a cylindrical projection, an edge of the cylindrical projection being located on an uppermost part of the straight cylindrical-shaped storage electrode," and "the edge of the cylindrical projection being rounded."

Nam et al has been cited for allegedly disclosing a capacitor with a storage electrode formed of platinum. However, such disclosure does not remedy the deficiencies of Yamada. Nam et al does not discuss the electric field concentration on the edge of the storage electrode. Also, Nam et al neither teaches nor suggests that the edge shape of the metal film can be reconstituted into a rounded or thickened shaped by heat treatment. Thus, one of ordinary skill in the art would not have been motivated to round and/or thicken the edge of the storage electrode of Nam et al.

For at least these reasons, independent claims 9 and 11 patentably distinguish over Yamada and Nam et al. Claim 10, depending from claim 9, and claim 12, depending from claim 11 also patentably distinguish over Yamada and Nam et al for at least the same reasons.

Thus, the 35 U.S.C. §103(a) rejection should be withdrawn.

In view of the aforementioned amendments and accompanying remarks, Applicant submits that that the claims, as herein amended, are in condition for allowance. Applicant requests such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney to arrange for an interview to expedite the disposition of this case.

Response under 37 C.F.R. §1.111
Attorney Docket No. 011724
Serial No. 10/020,951

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Sadao Kinashi
Attorney for Applicant
Registration No. 48,075

SK/fs
1250 Connecticut Avenue, NW
Suite 700
Washington, D.C. 20036
(202) 822-1100

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

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